

Residual Risk Report to Congress

Exhibit C-2
EPA - Clean Air Act - Title III
4-Year MACT Standards

MACT Standard / Source Categories	Number of Source Category	CFR Subparts	Statutory Date	Administrator Signed Promulgation	Fed Register Publication and Citation	Initial Compliance Date
AEROSPACE INDUSTRY	1	GG	11/15/94	07/31/95	09/01/95 (60FR45948)	09/01/98
ASBESTOS (delisted)	1	--	11/15/94	11/14/95	11/30/95 (60FR61550)	11/30/95
CHROMIUM ELECTROPLATING	6	N	11/15/94	11/22/94	01/25/95 (60FR49848)	01/25/96 decor; 01/25/97 others
Chromic Acid Anodizing						
Chromic Acid Anodizing*						
Decorative Chromium Electroplating						
Decorative Chromium Electroplating*						
Hard Chromium Electroplating						
Hard Chromium Electroplating*						
COKE OVENS	1	L	12/31/92	10/23/93	10/27/93 (58FR57898)	11/15/93
COMMERCIAL STERILIZERS	2	O	11/23/94	11/22/94	12/06/94 (59FR62585)	
Commercial Sterilization Facilities						
Commercial Sterilization Facilities*						
DEGREASE ORGANIC CLEANERS	2	T	11/15/94	11/15/94	12/02/94 (59FR61801)	12/02/97
Halogenated Solvent Cleaners						
Halogenated Solvent Cleaners*						
INDUSTRIAL COOLING TOWERS	1	Q	11/15/94	07/30/94	09/08/94 (59FR46339)	03/08/96
MAGNETIC TAPE	1	EE	11/15/94	11/22/94	12/15/94 (59FR64580)	12/15/96
MARINE VESSELS	1	Y	11/15/94	07/28/95	09/19/95 (60FR48388)	09/19/99
OFF-SITE WASTE TREATMENT	1	DD	11/15/94	05/28/96	07/01/96 (61FR34139)	07/01/99
PETRO REFINERIES	1	CC	11/15/94	07/28/95	08/18/95 (60FR4344)	08/18/98

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Exhibit C-2 (continued)
EPA - Clean Air Act - Title III
4-Year MACT Standards

MACT Standard / Source Categories	Number of Source Category	CFR Subparts	Statutory Date	Administrator Signed Promulgation	Fed Register Publication and Citation	Initial Compliance Date
PRINTING/PUBLISHING	1	KK	11/15/94	05/15/96	05/30/96 (61FR27132)	05/30/99
POLYMERS & RESINS I	9	U	11/15/94	07/15/96	09/05/96 (61FR46906)	03/05/97
Butyl Rubber						
Epichlorohydrin Elastomers						
Ethylene Propylene Rubber						
Hypalon (TM) Production						
Neoprene Production						
Nitrile Butadiene Rubber						
Polybutadiene Rubber						
Polysulfide Rubber						
Styrene-Butadiene Rubber & Latex						
POLYMERS & RESINS II	2	W	11/15/94	02/28/95	03/08/95 (60FR12670)	03/03/98
Epoxy Resins Production						
Non-Nylon Polyamides Production						
POLYMERS & RESINS IV	6	JJJ	11/15/94	05/15/96	09/12/96 (61FR48208)	03/12/97
~Acrylonitrile-Butadiene-Styrene						
~Methyl Methacrylate-Acrylonitrile+						
Methyl Methacrylate-Butadiene++						
~Polystyrene						
Styrene Acrylonitrile						
Polyethylene Terephthalate						
SECONDARY LEAD SMELTERS	1	X	11/15/94	5/31/95	06/23/95 (60FR32587)	06/23/97
SHIPBUILDING MACT	1	II	11/15/94	11/14/95	12/15/95 (60FR64330)	12/16/97
STAGE I GASOLINE DISTRIBUTION	1	R	11/15/94	11/23/94	12/14/94 (59FR64303)	12/15/97
WOOD FURNITURE	1	JJ	11/15/94	11/14/95	12/07/95 (60FR62930)	11/21/97
total sources	40					

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**Exhibit C-2 (continued)
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4-Year MACT Standards**

Table Legend:

* area source categories

+ Methyl Methacrylate-Acrylonitrile-Butadiene-Styrene

++ Methyl Methacrylate-Butadiene-Styrene Terpolymers

Admin signed date = actual date EPA Administrator signed package

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Exhibit C-3
EPA - Clean Air Act - Title III
7-Year MACT Standards

Statutory date - 11/15/97 (42 Source Categories)

7-YEAR STANDARDS Source Category	PROPOSE			PROMULGATE		
	Administrator signature	Actually proposed in FR	FR citation for proposed rule	Administrator signature	Actually promulgated in FR	FR citation: promulgated rule
Pesticide Active Ingredients^^	10/27/97	11/10/97	62FR60566	3/99		
Acrylic/Modacrylic Fibers (GMACT)	9/16/98	10/14/98	63FR55178	12/98		
Manuf. of Tetrahydrobenzaldehyde^^	8/15/97			5/1/98		
Chlorine Manuf.	11/99			11/2000		
Chromium Chemicals Manuf.	--			delisted 5/17/96		
Cyanide Chemicals Production (3)*	11/99			11/2000		
EAF: Stainless & Non-Stainless Steel (2)	--			delisted 5/17/96		
Ferroalloys Production	7/23/97	8/4/98	63FR41509	8/98		
Flexible Polyurethane Foam Prod.	12/09/96	12/27/98	61FR68408	9/15/98	10/7/98	63FR53980
Mineral Wool	4/29/97	5/8/97	62FR25370	4/98		
Nylon 6 Production	--			to be delisted		
Oil & Natural Gas Production	11/23/97	2/6/98	63FR6288	10/98		
Petroleum Refineries	8/25/98	9/11/98	63FR48890	3/99		
Pharmaceuticals Production	03/20/97	4/2/97	62FR15754	7/30/98	9/21/98	63FR50280
Polycarbonates Production (GMACT)	9/16/98	10/14/98	63FR55178	12/98		
Polyether Polyols Production	8/15/97	9/4/97	62FR48804	9/98		
Polymers & Resins III (2)*	9/30/98			7/99		
Portland Cement	3/9/98	3/24/98	63FR14182	9/98		
Publicly Owned Treatment Works (POTW)	11/12/98	12/1/98	63FR66085	1/99		
Primary Aluminum	08/22/96	9/26/96		9/19/97	10/7/97	62FR52384
Primary Copper	4/9/98	4/20/98	63FR19582	6/98		
Primary Lead Smelting	4/9/98	4/17/98	63FR19201	8/98		
Pulp & Paper (non-combust) MACT I^	12/17/93			11/14/97	4/15/98	63FR18504
Pulp & Paper (combustion) MACT II^	11/14/97	4/15/98	63FR18754	7/98		
Pulp & Paper (non-chem) MACT III^	2/29/96			11/97	4/15/98	
Reinforced Plastic Composites Prod.	10/99			11/2000		
Secondary Aluminum Prod.	3/98			3/99		
Steel Pickling	8/28/97	9/18/97	62FR49052	4/98		
Wood Treatment MACT	--			delisted 5/17/96		

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Exhibit C-3 (continued)
EPA - Clean Air Act - Title III
7-Year MACT Standards

7-YEAR STANDARDS		PROPOSE		PROMULGATE		
Source Category	Administrator signature	Actually proposed in FR	FR citation for proposed rule	Administrator signature	Actually promulgated in FR	FR citation: promulgated rule
Wool Fiberglass	2/25/97	3/31/97	62FR15228	3/98		
Acetal Resins (GMACT)	9/16/98	10/14/98	63FR55178			
Natural Gas Transmission and Storage	11/23/97	2/6/98	63FR6288			

Key Legend:

* = Standards with more than one Source Category (see below for breakdown)

^^ = formerly known as Agriculture Chemicals Production

^ = formerly known as Butadiene Dimers Production

^ = projects are part of the Pulp and Paper rule

7 YEAR STANDARD: BREAKDOWN OF SOURCE CATEGORIES

CYANIDE CHEMICALS PRODUCTION:

Sodium Cyanide Production
Hydrogen Cyanide Production
Cyanuric Chloride Production

POLYMERS & RESINS III:

Amino Resins
Phenolic Resins

PULP & PAPER:

MACT I - non-combustion
MACT II - combustion (kraft, soda, sulfite)
MACT III - non-chemical
NESHAP for Combustion Sources in the Semichemical Pulping Industry

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Exhibit C-4
EPA - Clean Air Act - Title III
10-Year MACT Standards

Statutory date - 11/15/00 (87 Source Categories)

10-YEAR STANDARDS Source Category	PROPOSE			PROMULGATE
	Administrator Signature	Actually proposed in FR	FR citation for proposed rule	
Aerosol Can-Filling Facilities	potential			delisting
Alumina Processing	11/99			11/2000
Ammonium Sulfate Production	11/99			11/2000
Antimony Oxides Manufacturing	potential			delisting
Asphalt Concrete Manufacturing	11/99			11/2000
Asphalt Roofing & Processing	08/98			08/99
Asphalt/Coal Tr Application-Metal Pipes	11/99			11/2000
Auto & Light Duty Truck (surface ctg.)	11/99			11/2000
Boat Manufacturing	12/99			12/2000
Carbon Black	11/99			11/2000
Carbonyl Sulfide (COS) Production via Carbon Disulfide	11/99			11/2000
Clay Products Manufacturing	11/99			11/2000
Coke By-Products	covered by 40CFR61 subpart L			
Coke Oven: Pushing, Quenching...	11/99			10/2000
Dry Cleaning (Petroleum Solvent)	potential			delisting
Engine Test Facilities	11/99			11/2000
Ethylene Processes	11/98			11/99
Flat Wood Paneling	11/99			11/2000
Flexible Poly Foam Fabrication Operations	03/99			06/2000
Friction Products Manufacturing	05/99			04/2000
Fume Silica Production	11/99			11/2000
Hydrogen Chloride Production	11/99			11/2000
Hydrogen Fluoride Production (GMACT)	9/16/98	10/14/98	63FR55178	12/98
Industrial Combustion Coord. Rule +	11/99			11/2000
Integrated Iron & Steel	11/99			11/2000
Iron & Steel Foundries	11/99			11/2000

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Exhibit C-4 (continued)
EPA - Clean Air Act - Title III
10-Year MACT Standards

10-YEAR STANDARDS Source Category	PROPOSE			PROMULGATE
	Administrator Signature	Actually proposed in FR	FR citation for proposed rule	
Lead Acid Battery Manufacturing	--			delisted 5/17/96
Leather Tanning & Finishing Operations	11/99			11/2000
Lime Manufacturing	4/99			04/2000
Manufacturing of Nutritional Yeast	10/7/98	10/19/98	63FR55183	06/99
Marine Vessel Loading Operations	--			7/28/95
Metal Can	11/99			11/2000
Metal Coil	11/99			11/2000
Metal Furniture	7/99			11/2000
Miscellaneous Cellulose +	12/99			11/2000
Miscellaneous Metal Parts	11/99			11/2000
Municipal Landfills	11/99			11/2000
Misc. Organic NESHAP (MON) +	11/99			11/2000
Nitrile Resins Production ^^	--			05/15/97
Non-Clay Refractories Manuf.	5/99			05/2000
Organic Liquids Distribution (Non-Gas)	11/99			11/2000
Paint Strippers	11/99			11/2000
Paper & Other Webs (Surface Ctg)	11/99			11/2000
Phosphoric Acid/ Phosphate Fertilizers ^	11/21/96	12/27/96		12/97
Plastic Parts & Products	11/99			11/2000
Plywood/Particle Board Manuf.	11/99			11/2000
Polyvinyl Chloride & Copolymers Prod	11/99			11/2000
Primary Magnesium	5/99			05/2000
Printing, Coating, & Dyeing of Fabrics	11/99			11/2000
Quaternary Ammonium Comp. Prod.	11/99			11/2000
Rocket Engine Test Firing	11/99			11/2000
Rubber Tire Production	3/99			12/99
Secondary Lead Smelters	--			5/31/95
Semiconductor Manuf.	11/99			11/2000

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Exhibit C-4 (continued)
EPA - Clean Air Act - Title III
10-Year MACT Standards

10-YEAR STANDARDS Source Category	PROPOSE			PROMULGATE
	Administrator Signature	Actually proposed in FR	FR citation for proposed rule	
Sewage Sludge Incinerators	4/99			05/2000
Spandex Production	11/99			11/2000
Taconite Iron Ore Processing	11/99			11/2000
Uranium Hexafluoride Prod.	11/99			11/2000
Vegetable Oil Production	11/99			11/2000

Table Legend:

+ = standards with more than one source category (see below for breakdown)

^ = two source categories being worked on together as one project

^^=Part of Polymers & Resins IV

BREAKDOWN OF SOURCE CATEGORIES FOR 10 YEAR MACT

MISCELLANEOUS CELLULOSE MACT

Carboxymethylcellulose Production
Cellulose Ethers Production
Cellulose Food Casing Manufacturing
Cellophane Production
Methylcellulose Production
Rayon Production

INDUSTRIAL COMBUSTION COORDINATING RULEMAKING

Industrial Boilers
Institutional/Commercial Boilers
Process Heaters
Stationary Internal Combustion Engines
Stationary Turbines

MISCELLANEOUS ORGANIC NESHAP (MON)

Alkyd Resins Production
Benzyltrimethylammonium Chloride Production
Carbonyl Sulfide Production
Chelating Agents Production
Chlorinated Paraffins Production
Ethylidene Norbornene Production
Explosives Production
Hydrazine Production
Maleic Anhydride Copolymers Production
Manufacture of Paints, Coatings, & Adhesives
OBPA/1,3-diisocyanate Production
Photographic Chemicals Production
Phthalate Plasticizers Production
Polyester Resins Production
Polymerized Vinylidene Chloride Production
Polymethyl Methacrylate Resins Production
Polyvinyl Acetate Emulsions Production
Polyvinyl Alcohol Production
Polyvinyl Butyral Production
Rubber Chemicals Production
Symmetrical Tetrachloropyridine Production

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Appendix D

**Summary of Response to
Science Advisory Board's (SAB) Review of
EPA's April 14, 1998 Draft Residual Risk Report to Congress**

Appendix D

Summary of Response to Science Advisory Board's (SAB) Review of EPA's April 14, 1998 Draft Residual Risk Report to Congress

Introduction

This appendix includes a summary of EPA's response to the Science Advisory Board (SAB) comments to EPA's April 14, 1998 draft Residual Risk Report to Congress (Report). The SAB is a public advisory group, comprised of non-EPA scientists, that provides extramural scientific information and advice to EPA. At EPA's request, the Residual Risk Subcommittee of SAB convened on August 3, 1998 to review the Report. The SAB found the Report to be overall a good draft of a strategy document; however, the Subcommittee indicated that certain areas of the Report should be strengthened before it can be applied to actual residual risk assessments. The Subcommittee was highly supportive of the Agency's plan to inform the SAB in 1999 with examples in which the Report's strategy has been applied to specific areas. The SAB endorsed the underlying risk assessment (RA)/risk management (RM) approach described in the Report. However, the SAB added that the following issues needed to be addressed more directly and explicitly before finalizing the Report.

- (1) The Report should more carefully convey the limitations of the data, models, and methods that are described or that would be needed to carry out the residual risk assessment activities.
- (2) The Report should contain or cite specific examples to clarify what some of the bold, but vague, language is intended to convey.
- (3) There needs to be a more clearly described screening approach that will prioritize stressors for assessment and will husband (i.e., conserve) Agency resources.
- (4) The Report should be more explicit about how the residual risk assessments will be used to make risk management decisions.

Executive Summary of SAB's Review

The following is the full text of the executive summary of SAB's review of EPA's draft Residual Risk Report to Congress.

Section 112(f)(1) of the Clean Air Act (CAA), as amended, directs EPA to prepare a Residual Risk Report to Congress (Report) that describes the methods to be used to assess the risk remaining, (i.e., the residual risk) after maximum achievable control technology (MACT)

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standards, applicable to emissions sources of hazardous air pollutants (HAPs), have been promulgated under Section 112(d). The Report presents EPA's proposed strategy for dealing with the issue of residual risk and reflects consideration of technical recommendations in reports by the National Research Council ["Science and Judgment"] (NRC, 1994) and the Commission on Risk Assessment and Risk Management (CRARM, 1997). As a strategy document, the Agency's Report describes general directions, rather than prescribed procedures. The announced intent is to provide a clear indication of the Agency's plans while retaining sufficient flexibility that the program can incorporate changes in risk assessment methodologies that will evolve during the 10-year lifetime of the residual risk program.

In June, 1998, the Science Advisory Board (SAB) was asked to review the Agency's April 14, 1998 draft Report to Congress on Residual Risk. The Board was asked to focus primarily on the five specific charge questions that are addressed in the report:

- a) Has the Residual Risk Report to Congress (Report) properly interpreted and considered the technical advice from previous reports, including:
 - (1) The NRC's 1994 report "Science and Judgment in Risk Assessment", and
 - (2) The 1997 report from the Commission on Risk Assessment and Risk Management, in developing its risk assessment methodology and residual risk strategy?
- b) Does the Report identify and appropriately describe the most relevant methods (and their associated Agency documents) for assessing residual risk from stationary sources?
- c) Does the Report provide an adequate characterization of the data needs for the risk assessment methods?
- d) Does the Report provide adequate treatment of the inherent uncertainties associated with assessment of residual risks?
- e) Does the Report deal with the full range of scientific and technical issues that underlie a residual risk program?

An SAB Subcommittee of the Executive Committee met in public session on August 3, 1998 at the USEPA main auditorium in Research Triangle Park, NC. Written comments prepared before and after the meeting by Subcommittee members form the basis for this report. Those comments are included in Appendix A for the edification of the Agency as an illustration of the issues identified by the Subcommittee members and the range of views expressed.

In short, the SAB found the Report to be a generally good draft of a strategy document, but one that must be strengthened in a number of important places prior to its submission to

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Congress. The Subcommittee was highly supportive of the approach that the Agency described in terms of coming back to the SAB in 1999 with examples in which the Report's strategy is applied to specific cases.

Overall, the Report utilizes the risk assessment(RA)/risk management (RM) framework, endorsed by the SAB and others. It emphasizes the dynamic and evolving nature of the RA process by not being overly prescriptive, while also providing some bounds to the process in both the areas of RA and RM. The Agency has clearly studied the National Research Council and Commission on RA/RM reports that related to this topic and has addressed many of the concerns and suggestions that they raised. At the same time, there are additional points that should be confronted more directly, including the following:

- (1) *The Report gives a misleading impression that more can be delivered than is scientifically justifiable, given the data gaps and limited resources (e.g., time, funding) for conducting the residual risk assessments. The Subcommittee recommends that the Report more carefully convey the limitations of the data, models, and methods that are described or that would be needed to carry out the residual risk assessment activities.*

The task of conducting so many assessments of the risks remaining after implementation of MACT controls is daunting, but doable. While the Report describes a general strategy for accomplishing this task, it does not address many of the outstanding, practical difficulties that will have to be overcome in carrying out the strategy. For example, there will likely be many situations in which the data implied in the strategy are absent. Although a number of options exist, it is not clear what the Agency will do in such cases. Other problems that need attention include: computer models that have had only limited independent testing for their application to a particular problem and/or have not been adequately validated for its general applicability across a wide array of situations, information in important toxicological databases that is outdated or has had limited peer review, and special limitations in information and tools for ecological risk assessment. The Congress and the public, on the basis of reading this Report, may have unrealistically high expectations of what the Agency can, in fact, deliver in terms of the accuracy, precision, and timeliness of residual risk assessments.

- (2) *The Report should contain or cite specific examples to clarify what some of the bold, but vague, language is intended to convey.*

The Report lacks any specific examples and/or citations of existing examples to illustrate its discussion of the many complex and difficult issues involved, such as, but not limited to, the following:

- a) Involving stakeholders in the process, which is particularly important when it comes to sharing information among the Federal and State Governments and industry.
- b) Determining the criteria for when to use other than default assumptions.

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- c) Addressing background contamination and competing sources of risks (e.g., mobile and area sources).
 - d) Dealing with the trade-off between risks from HAPs and possible risks posed by measures to reduce the HAPs risks.
 - e) Assessing risks in the face of significant limitations in the available data, the lack of validation of existing and emerging computer models, and the need to consider uncertainty in the results.
 - f) Employing screening tiers and emerging risk assessment methodologies in such a way that scarce resources are targeted on the most important assessments and are not expended on resource-intensive, low-information-yield analyses.
 - g) Providing a public health perspective to these issues.
- (3) *There needs to be a more clearly described screening approach that will prioritize stressors for assessment and will conserve Agency resources. The Report should more clearly present the approach by which the Agency will perform the screening and prioritization.*

There is the potential that the Residual Risk program could evolve into a large, resource-intensive activity unless there is an appropriate and well-supported screening approach in place to prioritize assessments among the 188 pollutants and 174 source categories. The screening methods should be such that they avoid generating a large number of "false positives" -- that would drain scarce RA resources -- or "false negatives" -- that could result in leaving high risk situations unaddressed. Unless the Agency carefully prioritizes its assessments and conserves its resources, the program could evolve either into a wide, but shallow, program that fails to adequately quantify and target residual risks or into a program that fails to address a sufficient number of pollutants and sources, due to over-analysis of just a few cases.

- (4) *The Report should be more explicit about how the residual risk assessments will be used to make risk management decisions.*

The Subcommittee recognizes that the Report is a description of a strategy for RA, not for RM, per se. However, as S&J and the CRARM report each emphasize, there should be open communication between risk assessors and risk managers at the beginning of the process, so that it is clear how the RA will fit into the RM process. If the Residual Risk program is, indeed, to be "science-based", then it is important that there be, even in a strategy document, some discussion of what type of RA is needed and how its results will be factored with other legitimate risk management factors during the final stages of decision making.

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The Subcommittee strongly encourages the Agency to implement their plan to bring to the SAB for review in 1999 some applications of the Residual Risk strategy as specific illustrations of how these complex issues will be addressed. This approach will permit more detailed discussion of many of the implementation issues that members felt will arise when residual risk assessments are made.

Considering a larger issue beyond its specific Charge, the Subcommittee expressed some concern about the manner in which risks from HAPs are being addressed, when compared with the risks posed by Section 109 Criteria Air Pollutants (CAPs). There are differences in the wording of the Clean Air Act Amendments as to the level of risk avoidance that should be provided. This incongruity is puzzling and suggests that it may be useful to reevaluate how risks are assessed and managed for these two types of airborne pollutants. We recognize that the current legislation requires that these two classes of pollutants be treated separately. However, since the Agency was specifically asked to suggest changes in the legislation, there is an opportunity to propose a more comprehensive framework upon which to build the assessment and management of the risks from both HAPs and CAPs. Such a broader public health perspective would result in greater improvements in health and environmental benefits for a given expenditure of resources. The Agency has taken some steps towards a comprehensive view of HAPs and CAPs in its Report to Congress on the Costs and Benefits of the Clean Air Act, 1970-1990 (EPA 1997) that has been reviewed earlier by the SAB (SAB 1997, 1996) and those steps should be continued. The contrast in relative benefits of the two programs was revealing.

In addition, the Agency Staff should consider outlining a number of the most important Residual Risk issues in a policy memo to top management; e.g., the limitations on what science can deliver and the comparison between the Section 112 (HAPs) program and the Section 109 (CAPs) program. These managers should be made aware of the problems involved and be given the opportunity to provide the kind of guidance that would clarify these matters for the benefit of those both inside and outside of the Agency.

In summary, the Agency's Report is a useful strategic document that will help guide the Agency as it moves ahead with the Residual Risk program. However, the Subcommittee recommends that the Agency be more candid with Congress and the public about what can be accomplished with existing limitations in data, models, methods, time, and resources. The Subcommittee has pointed out many areas that will require more thought, more documentation, and more articulation before the program is actually implemented.

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Response to SAB Comments

In this section, EPA addresses SAB's four major comments.

1. **The report should more carefully convey limitations of data, models, and methods that are described or that would be needed to carry out residual risk assessment activities.**

RESPONSE

The report has been revised to clarify the current availability of data and tools relevant to air toxics risk assessment, the resultant limitations of the risk assessments, and plans for data and tool development to improve this situation. The more obvious limitations include the lack of dose-response assessments and ecological criteria for many HAPs. This situation significantly handicaps our risk assessment for those HAPs, thus limiting the scope of some source category risk assessments. This leads to a greater level of uncertainty regarding residual risks than if all data gaps were filled.

Sections detailing the availability of data, methodology, or models, as appropriate, have been included in the report following the discussion of each of the various components of the risk assessment process. In addition to describing the current availability and completeness of data or methodology, and how that may affect the limitations and uncertainties associated with risk assessments, plans to improve that situation (i.e., data and tool development activities and priorities) are also presented.

2. **The report should contain or cite specific examples to clarify what some of the "bold, but vague language" is intended to convey.**

RESPONSE

General discussion of some topics in the Report is necessary given that the Agency is in the initial stages of the residual risk assessment process and that evaluation of the process following initial analyses may lead to changes. However, clarifying language has been incorporated to provide the reader with a better understanding of the methods and general process presented.

A new subsection on stakeholder involvement has been added to highlight ways in which stakeholders may be involved in the risk assessment process. Additional text has been added to describe the term "default options." In the restructured chapter on the general risk assessment framework for residual risk, differences between the screening and refined tiers are more clearly described. A major difference between the two tiers is the use of conservative assumptions in the screening tier. In the refined tier, additional data or more refined modeling are relied upon to replace the conservative assumptions. That

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is, the specificity and complexity (and consequently resource intensiveness) increases with each tier. Additionally, experience from case studies will inform the problem formulation stage in later source category assessments.

The section describing the risk characterization step for both human health and ecological risk assessments is strengthened regarding presentation of calculated risks in context of uncertainties associated with the analysis and, as data are available, risk posed by background concentrations. Additional available public health information may also be presented in this step for final risk assessment iterations (i.e., those supporting regulatory risk management decisions). The section of the Report addressing Clean Air Act section 112(f)(1)(B) discussion of uncertainties in the risk assessment methodology and analysis of uncertainties in air toxics risk assessment has been substantively revised.

As risk management decisions are made regarding the need for residual risk standards, information specific to each source category regarding risks associated with implementation of controls can be considered.

To improve clarity of descriptions of ecological risk assessment methodology, examples have been added to the report.

3. **There needs to be a more clearly described screening approach that will prioritize stressors for assessment and will conserve Agency resources.**

RESPONSE

The chapter on the general framework for the residual risk risk assessment process has been restructured to better describe the screening and refined tiers of assessment. The screening tier provides the ability to identify those source categories or subcategories and HAPs that may need to move into the refined assessment tier. The risk estimates derived in the screening tier can be used in conjunction with information on available data and other relevant information to set priorities for refined analyses. The Report is not meant to provide a detailed description of data, assumptions, and analyses within each tier, i.e., the Report is not meant to be a guidance document. Rather, it provides a description of the general framework for the risk assessment process. Use of the tiered approach allows EPA to efficiently and effectively use resources and available data. The screening tier is less resource intensive, and more likely overly conservative, while the refined tier requires more resources and relies on more realistic assumptions. The decision made with results of the screening analysis is “no further action” or “refine analysis,” while the decision made with results of the more refined analyses is “no further action” or “consider additional emissions control.”

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4. The Report should be more explicit about how the residual risk assessments will be used to make risk management decisions.

RESPONSE

As EPA's process for conducting residual risk assessments and consideration of those results in risk management decision is evolving, the Report is not intended to provide details regarding risk management decisions. The Report includes general descriptions of risk management decision points within the risk assessment framework, e.g., during problem formulation and scoping phases and in consideration of iterative assessment results.

Appendix E
Summary of MACT Standards and Control Technologies

Residual Risk Report to Congress

Table I - Summary of MACT for Process Vents Under Promulgated NESHAP ^(a)
MACT Control Level for Affected Sources

40 CFR 63 Subpart	Industry Source Category	HAP Emission Control Standard	Alternative Standards Established by Subpart
Subpart G	HON	HAP control efficiency $\geq 98\%$	Vent to a flare, or Vent to control device with HAP outlet concentration ≤ 20 ppmv
Subpart M	Perchloroethylene Dry Cleaning	Vent to refrigerated condenser, carbon adsorber, or "equivalent control device" as applicable to machine ^(b)	none specified
Subpart O	EO Sterilization	Ethylene oxide (EO) control efficiency $\geq 99\%$	Achieve aeration room vent EO concentration ≤ 1 ppmv
Subpart U	Group I Polymers and Resins	Continuous process HAP control efficiency $\geq 98\%$ and Batch process HAP control efficiency $\geq 90\%$	Vent to a flare, or Vent to control device with HAP outlet concentration ≤ 20 ppmv
Subpart W	Group II Polymers and Resins	HAP control efficiency $\geq 98\%$ ^(c)	Achieve mass emission limit $\leq 5,000$ lb HAP / yr ^(c)
Subpart CC	Petroleum Refineries	HAP control efficiency $\geq 98\%$	Vent to a flare, or Vent to control device with HAP outlet concentration ≤ 20 ppmv ^(d)
Subpart DD	Off-Site Waste and Recovery	HAP control efficiency $\geq 95\%$ ^(e)	Vent to a flare, or Vent to <u>combustion</u> control device with HAP outlet concentration ≤ 20 ppmv
Subpart EE	Magnetic Tape Manufacturing	HAP control efficiency $\geq 95\%$	none specified
Subpart JJJ	Group IV Polymers and Resins	Continuous process HAP control efficiency $\geq 98\%$ ^(f) and Batch process HAP control efficiency $\geq 90\%$ ^(f)	Alternative standards available for process vents in certain subcategories under conditions selected in rule. These options include (not all options are allowed in all cases): achieve HAP emission limit per unit of product produced; vent to control device with HAP outlet concentration ≤ 20 ppmv; and vent to a flare.

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Table I (concluded)

TABLE NOTES:

- (a) This is a summary table prepared to group the MACT standards by similar HAP emission points. It is **not** a comprehensive listing of the individual subpart requirements, and is **not** to be used to determine the applicability and compliance requirements under 40 CFR part 63 for a specific facility location.
- (b) Under Subpart M, owner/operator has the option of venting the air-perchloroethylene vapor stream exhausted from existing dry-cleaning machine to carbon adsorber provided control device installed before 9/22/93.
- (c) Under Subpart W process vents are included in the group of emission points that must be controlled to achieve an overall maximum emission limit standard for the resin or polyamine manufacturing process. The standard listed in this table applies only for resin manufacturing processes that are new sources.
- (d) Under Subpart CC these emission limit standards are not explicitly stated as an alternative standard, but is applied implicitly through the applicability provision specifying the affected process vents requiring Organic HAP Emission Controls (see Table 6a).
- (e) Under Subpart DD, an owner/operator may elect to meet this control efficiency standard by averaging emissions from all of the affected process vents.
- (f) This is the minimum control efficiency for most subcategories.

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**Table II - Summary of MACT for Equipment Leaks Under Promulgated NESHAP ^(a)
MACT Control Level for Affected Sources**

40 CFR 63 Subpart	Industry Source Category	Standards Established by Subpart for Affected Equipment (see Table 9a)
Subpart F/H	HON	<ul style="list-style-type: none"> Implement leak detection and repair program for affected pumps, valves, and connectors. Monitoring interval established by performance requirements for a maximum allowable percentage of leaking components Standards for compressors, open-ended lines, pressure relief devices, and sampling connections same as in 40 CFR 61 subpart V. Alternative standards for batch processes and for equipment inside an enclosed building.
Subpart R	Gasoline Distribution	Monthly leak inspection of all affected equipment
Subpart U	Group I Polymers and Resins	Comply with 40 CFR 63 subpart H
Subpart CC	Petroleum Refineries	Existing Sources: comply with either 40 CFR 60 subpart VV or 40 CFR 63 subpart H New Sources: comply with 40 CFR 63 subpart H
Subpart DD	Off-Site Waste and Recovery	Comply with 40 CFR 61 subpart V (as an alternative owners/operators may comply with 40 CFR 63 subpart H)
Subpart JJJ	Group IV Polymers and Resins	Comply with 40 CFR 63 subpart H

(a) This is a summary table prepared to assist in grouping the MACT standards by similar HAP emission points. It is **not** a comprehensive listing of the individual subpart requirements, and is **not** to be used to determine the applicability and compliance requirements under 40 CFR part 63 for a specific facility location.

*Residual Risk Report to Congress***Table III - Summary of MACT for Organic Coating Application Operations Under Promulgated NESHAP ^(a)**

40 CFR 63 Subpart	Industry Source Category	Affected Source	Standards Established by Subpart	
			Maximum Emission Limit	Alternative Standards
Subpart EE	Magnetic tape manufacturing	Magnetic tape coating application	≤ 180 grams HAP per liter of solids in coating	Achieve HAP control efficiency $\geq 95\%$
Subpart GG	Aerospace manufacturing and rework facilities	Primer paint application	≤ 350 grams HAP per liter of coating	Achieve HAP control efficiency $\geq 81\%$
		Topcoat paint application	≤ 420 grams HAP per liter of coating	Achieve HAP control efficiency $\geq 81\%$
		Milling maskant application	≤ 160 grams HAP per liter of coating	Achieve HAP control efficiency $\geq 81\%$
Subpart II	Shipbuilding and ship repair	Ship paint application	Meet either applicable limit: grams HAP per liter of coating ^(b) or grams HAP per liter of solids in coating ^(b)	none
Subpart JJ	Wood furniture manufacturing	Finish coating application	applicable limit in grams HAP per grams of solids in coating ^(b)	none
		Contact adhesive application	applicable limit in grams HAP per grams of solids in adhesive ^(b)	none
Subpart KK	Printing and publishing	Publication rotogravure printing ^(c)	$\leq 8\%$ total organic HAP applied by each press per month on mass basis	Achieve HAP control efficiency $\geq 92\%$
		Product and packaging rotogravure and wide-web flexographic printing ^(c)	$\leq 4\%$ total organic HAP applied by each press per month on mass basis	none

Table III (concluded)

TABLE NOTES:

- (a) This is a summary table prepared to assist in grouping the MACT standards by similar HAP emission points. It is **not** a comprehensive listing of the individual subpart requirements, and is **not** to be used to determine the applicability and compliance requirements under 40 CFR part 63 for a specific facility location.
- (b) Different numerical values are specified for different types of coatings and for existing sources and new sources.
- (c) Rule distinguishes between a "printing operation" and a "coating operation," but both are included as part of the affected sources if a press is capable of printing or coating on the same substrate.

*Residual Risk Report to Congress*Table IV - Summary of MACT for Organic Solvent Cleaning Operations Under Promulgated NESHAP ^(a)

40 CFR 63 Subpart	Industry Category	Affected Source	Standards Established by Subpart
Subpart T	Halogenated solvent cleaning	Batch cold solvent cleaning machines	<ul style="list-style-type: none"> • Use tight-fitting covers except when adding or removing parts to be cleaned • Minimum machine freeboard ratio specified • Implement specific work practices requirements.
		Batch vapor and In-line cleaning machines	<ul style="list-style-type: none"> • Specific machine equipment design requirements • Install and operate one of the control options specified in the rule. Control options are different combinations of equipment (refrigeration or carbon adsorber devices), minimum machine freeboard ratios, and reduced room draft rates. Number of control options vary depending on solvent cleaning machine type and whether it is an existing or new source. • Meet machine idling emission limit expressed in terms of kg of the total halogenated HAP solvent emissions per hour per m² solvent/air interface. Numerical value varies depending on type of solvent cleaning machine. • Implement specific work practices requirements.
Subpart EE	Magnetic tape manufacturing	Wash sinks	<ul style="list-style-type: none"> • Implement one of the following options: Option 1: Achieve for each sink overall HAP control efficiency \geq 88% Option 2: Maintain minimum freeboard ratio of 75%.
Subpart GG	Aerospace manufacturing and rework facilities	Solvent cleaning operations	<ul style="list-style-type: none"> • Implement specific work practice requirements
		Depainting operations	<ul style="list-style-type: none"> • Existing sources achieve overall HAP control efficiency \geq 81% • New sources achieve overall HAP control efficiency \geq 95% • Implement specific work practices requirements.

Table IV (concluded)

TABLE NOTES:

- (a) This is a summary table prepared to assist in grouping the MACT standards by similar HAP emission points. It is **not** a comprehensive listing of the individual subpart requirements, and is **not** to be used to determine the applicability and compliance requirements under 40 CFR part 63 for a specific facility location.

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16. ABSTRACT This report has been prepared in response to section 112(f)(1) of the Clean Air Act and provides the Congress and the public with a description of the methods and general framework that EPA will use to assess the public health and environmental risk which may remain after implementation of air toxics emissions standards required under section 112(d) of the Clean Air Act. This remaining risk is referred to as "residual risk." Air toxics, also known as hazardous air pollutants, are those pollutants known or suspected to cause cancer or other adverse health effects to humans or adverse environmental effects. This report also discusses specific issues relevant to the evaluation of residual risk and methods and costs of reducing such risk.		
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